



Guideline for Make-or-Buy Decision

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Purpose

The purpose of this document is to provide guidance for how to apply and tailor the Decision Analysis and Resolution (DAR) subprocess to the specific case of a software make-or-buy decision. This document also includes specific guidance for the evaluation and selection of off-the-shelf (OTS) products. Note that we use the term OTS to include both commercial off-the-shelf (COTS) and government off-the-shelf (GOTS) products.

Scope

This guideline is applicable to all GSFC mission software projects for which it may be necessary to decide between the development of custom software and the acquisition of OTS products. It need not be used if the system requirements specify whether the software in question should be made or acquired.

Guideline

The overall make-vs.-buy decision is arrived at by following the [ISD Decision Analysis and Resolution \(DAR\) Subprocess](#).

The ISD DAR Subprocess comprises seven basic steps, as follows:

1. Plan the formal evaluation
2. Monitor and track progress
3. Develop and assess criteria
4. Identify and document alternative solutions
5. Select evaluation method
6. Evaluate alternatives
7. Select an alternative.

When there is a choice of developing custom software on a project, or acquiring an available OTS product, it is necessary to look at both alternatives and arrive at a make-or-buy decision. OTS evaluation and selection generally involves a trade study and a comparison of features.

Here are suggestions for applying the seven steps of the general DAR subprocess to this type of decision. Note that DAR requires that the results of each step be documented. See the template in the DAR subprocess for the final report. It is recommended that you start the final report during Step 1, and then simply add to it for each subsequent step.

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1. Plan the formal evaluation. If a trade study of OTS products is required, determine the scope and ground rules for the trade study. Also define the requirements that the OTS product to be selected must meet.
 2. Monitor and track progress. No elaboration of this step of the DAR subprocess is required for make-or-buy decisions.
 3. Develop and assess criteria. Develop the evaluation criteria to be used for making the make-or-buy decision. Follow the steps documented in Task 3 of the DAR Subprocess in developing the criteria, being sure to include the risks of using both developed and acquired software, the business stability of the candidate OTS provider, and the anticipated need for maintenance of the custom or acquired software. If a trade study of OTS products is required, define and review the OTS evaluation criteria and weighting factors to be used during the trade study.
 4. Identify and document alternative solutions. For OTS trade studies, in addition to the suggestions in step (a) of Task 4 of the DAR subprocess, assess each of the available OTS products and identify their respective strengths and weaknesses. Research the history of the company or organization that has developed each OTS product under consideration. What has been their track record? How much success has GSFC had with other products acquired from that source? For GOTS products, consider GOTS from other NASA Centers as well as from GSFC. Will there be Software Use Agreements to be signed/developed to reuse GOTS? Who will maintain the GOTS software? Are the changes made to acquired software required to be delivered back to the originating organization (part of the Use Agreement)? Also estimate the difficulty, cost, and technical risk associated with custom software development. Will this software need to “push the envelope” of available technology?
 5. Select evaluation method. Simulation and prototyping would be most appropriate for evaluation of the custom software option. For trade studies, several rounds of ranking and evaluation are usually performed. In this manner, the number of products under consideration may be reduced to the one or two that are most suitable.
 6. Evaluate alternatives. Follow the steps in Task 6 of the DAR subprocess. For evaluation of the custom software option, estimate the following: cost of custom development, functionality that could readily be provided, likely performance constraints, and ease of maintaining the custom software.
 7. Select an alternative. Document the selection, as called for in the DAR subprocess.

Measures
Recommended Measures:

On a monthly basis, collect the following measures:

- Number of custom and OTS products evaluated

- Total staff hours applied to evaluation and selection of OTS products
- Staff hours applied to any other software make-or-buy decisions.

Required Measures: None.

Tools and Templates

The following tools and templates are available in the ISD Process Asset Library, at <http://software.gsfc.nasa.gov/process.cfm>, or elsewhere as indicated.

Name	Description
(None)	

References

The following resource documents are relevant to the guideline:

- **Glossary:** <http://software.gsfc.nasa.gov/glossary.cfm>
Defines common terms used in ISD processes
- **Process Asset Library:** <http://software.gsfc.nasa.gov/process.cfm>
Library of all ISD process descriptions
- "Managing the Use of Commercial Off the Shelf (COTS) Software Components for Mission-Critical Systems," American Institute of Aeronautics and Astronautics, AIAA G-118-200X (Unpublished draft).

Change History

Version	Date	Description of Improvements
1.0	9/13/07	Initial approved version by CCB